Abstract in preparation for submittal to the
189th meeting of AAS 12-16 January 1997, Toronto, ON

Simulations of supernova-relevant hydrodynamic instability experiments on the Nova laser,* J. Kane,[1] W.D. Arnett,[1] B.A. Remington,[2] A. Rubenchik,[3] J. Castor,[2] and W.M. Wood-Vasey,[4] [1]U. Arizona, [2]LLNL, [3]U.C. Davis, [4]Harvey-Mudd College. Supernova 1987A focused attention on the critical role of hydrodynamic instabilities in the evolution of supernovae. To test the modeling of these instabilities, we are developing laboratory experiments of hydrodynamic mixing under supernova-relevant conditions. The target consists of a two-layer planar package composed of 85 mm Cu backed by 500 μm CH_2 with a single mode λ=200 μm, η_o=20 μm sinusoidal perturbation at the interface. The Nova laser is used in indirect-drive to generate a 10-15 Mbar shock at the interface, which triggers perturbation growth due initially to the Richtmyer-Meshkov instability followed by the Rayleigh-Taylor instability as the interface decelerates. This simulates the situation at the He-H interface of a Type II supernova at intermediate times, t ~ 1000 sec. Modeling of the experiment is done using the hydrodynamics codes HYADES and CALE, and the supernova code PROMETHEUS. Results of the experiments and simulations will be presented, and possible implications for supernova modeling will be discussed. *Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under contract number W-7405-ENG-48.